



TECHNICAL DATA

NPN SILICON TRANSISTOR

Qualified per MIL-PRF-19500/366

Devices

2N3498	2N3499	2N3500	2N3501
2N3498L	2N3499L	2N3500L	2N3501L

Qualified Level

JAN
JANTX
JANTXV
JANS

MAXIMUM RATINGS

Ratings	Symbol	2N3498* 2N3499*	2N3500* 2N3501*	Unit
Collector-Emitter Voltage	V_{CEO}	100	150	Vdc
Collector-Base Voltage	V_{CBO}	100	150	Vdc
Emitter-Base Voltage	V_{EBO}	6.0	6.0	Vdc
Collector Current	I_C	500	300	mAdc
Total Power Dissipation @ $T_A = 25^\circ\text{C}$ ⁽¹⁾ @ $T_C = 25^\circ\text{C}$ ⁽²⁾	P_T	1.0 5.0		W W
Operating & Storage Junction Temp. Range	T_J, T_{stg}	-55 to +200		$^\circ\text{C}$

THERMAL CHARACTERISTICS

Characteristics	Symbol	Max.	Unit
Thermal Resistance: Junction-to-Case	$R_{\theta JC}$	35	$^\circ\text{C/W}$
Junction-to-Ambient	$R_{\theta JA}$	175	

*Electrical characteristics for "L" suffix devices are identical to the "non L" corresponding devices

1) Derate linearly 5.71 W/ $^\circ\text{C}$ for $T_A > 25^\circ\text{C}$

2) Derate linearly 28.6 W/ $^\circ\text{C}$ for $T_C > 25^\circ\text{C}$



TO-5*
2N3498L, 2N3499L
2N3500L, 2N3501L



TO-39* (TO-205AD)
2N3498, 2N3499
2N3500, 2N3501

*See appendix A for package outline

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

Characteristics	Symbol	Min.	Max.	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage $I_C = 10 \text{ mAdc}$	2N3498, 2N3499 2N3500, 2N3501	$V_{(BR)CEO}$	100 150	Vdc
Collector-Base Cutoff Current $V_{CB} = 50 \text{ Vdc}$ $V_{CB} = 75 \text{ Vdc}$ $V_{CB} = 100 \text{ Vdc}$ $V_{CB} = 150 \text{ Vdc}$	2N3498, 2N3499 2N3500, 2N3501 2N3498, 2N3499 2N3500, 2N3501	I_{CBO}	50 50 10 10	ηAdc ηAdc μAdc μAdc
Emitter-Base Cutoff Current $V_{EB} = 4.0 \text{ Vdc}$ $V_{EB} = 6.0 \text{ Vdc}$		I_{EBO}	25 10	ηAdc μAdc



ELECTRICAL CHARACTERISTICS (con't)

Characteristics	Symbol	Min.	Max.	Unit
ON CHARACTERISTICS ⁽³⁾				
Forward-Current Transfer Ratio I _C = 0.1 mA _{dc} , V _{CE} = 10 V _{dc} 2N3498, 2N3500 2N3499, 2N3501 I _C = 1.0 mA _{dc} , V _{CE} = 10 V _{dc} 2N3498, 2N3500 2N3499, 2N3501 I _C = 10 mA _{dc} , V _{CE} = 10 V _{dc} 2N3498, 2N3500 2N3499, 2N3501 I _C = 150 mA _{dc} , V _{CE} = 10 V _{dc} 2N3498, 2N3500 2N3499, 2N3501 I _C = 300 mA _{dc} , V _{CE} = 10 V _{dc} 2N3500 2N3501 I _C = 500 mA _{dc} , V _{CE} = 10 V _{dc} 2N3498 2N3499	h _{FE}	20 35 25 50 35 75 40 100 15 20 15 20	120 300	
Collector-Emitter Saturation Voltage I _C = 10 mA _{dc} , I _B = 1.0 mA _{dc} I _C = 300 mA _{dc} , I _B = 30 mA _{dc} I _C = 150 mA _{dc} , I _B = 15 mA _{dc} All Types 2N3498, 2N349 2N3500, 2N3501	V _{CE(sat)}		0.2 0.6 0.4	V _{dc}
Base-Emitter Saturation Voltage I _C = 10 mA _{dc} , I _B = 1.0 mA _{dc} I _C = 300 mA _{dc} , I _B = 30 mA _{dc} I _C = 150 mA _{dc} , I _B = 15 mA _{dc} All Types 2N3498, 2N3499 2N3500, 2N3501	V _{BE(sat)}		0.8 1.4 1.2	V _{dc}

DYNAMIC CHARACTERISTICS

Forward Current Transfer Ratio, Magnitude I _C = 20 mA _{dc} , V _{CE} = 20 V _{dc} , f = 100 MHz	h _{fe}	1.5	8.0	
Output Capacitance V _{CB} = 10 V _{dc} , I _E = 0, 100 kHz ≤ f ≤ 1.0 MHz 2N3498, 2N3499 2N3500, 2N3501	C _{obo}		10 8.0	pF
Input Capacitance V _{EB} = 0.5 V _{dc} , I _C = 0, 100 kHz ≤ f ≤ 1.0 MHz	C _{ibo}		80	pF

SWITCHING CHARACTERISTICS

Turn-On Time V _{EB} = 5 V _{dc} ; I _C = 150 mA _{dc} ; I _{B1} = 15 mA _{dc}	t _{on}		115	ns
Turn-Off Time I _C = 150 mA _{dc} ; I _{B1} = I _{B2} = -15 mA _{dc}	t _{off}		1150	ns

SAFE OPERATING AREA

DC Tests T _C = +25°C, t _r ≥ 10 ns; 1 Cycle, t = 1.0 s				
Test 1 V _{CE} = 10 V _{dc} , I _C = 500 mA _{dc} V _{CE} = 16.67 V _{dc} , I _C = 300 mA _{dc} 2N3498, 2N3499 2N3500, 2N3501				
Test 2 V _{CE} = 50 V _{dc} , I _C = 100 mA _{dc} All Types				
Test 3 V _{CE} = 80 V _{dc} , I _C = 40 mA _{dc} All Types				
Clamped Switching T _A = +25°C				
Test 1 I _B = 85 mA _{dc} , I _C = 500 mA _{dc} I _B = 50 mA _{dc} , I _C = 300 mA _{dc} 2N3498, 2N3499 2N3500, 2N3501				

(3) Pulse Test: Pulse Width = 300μs, Duty Cycle ≤ 2.0%.